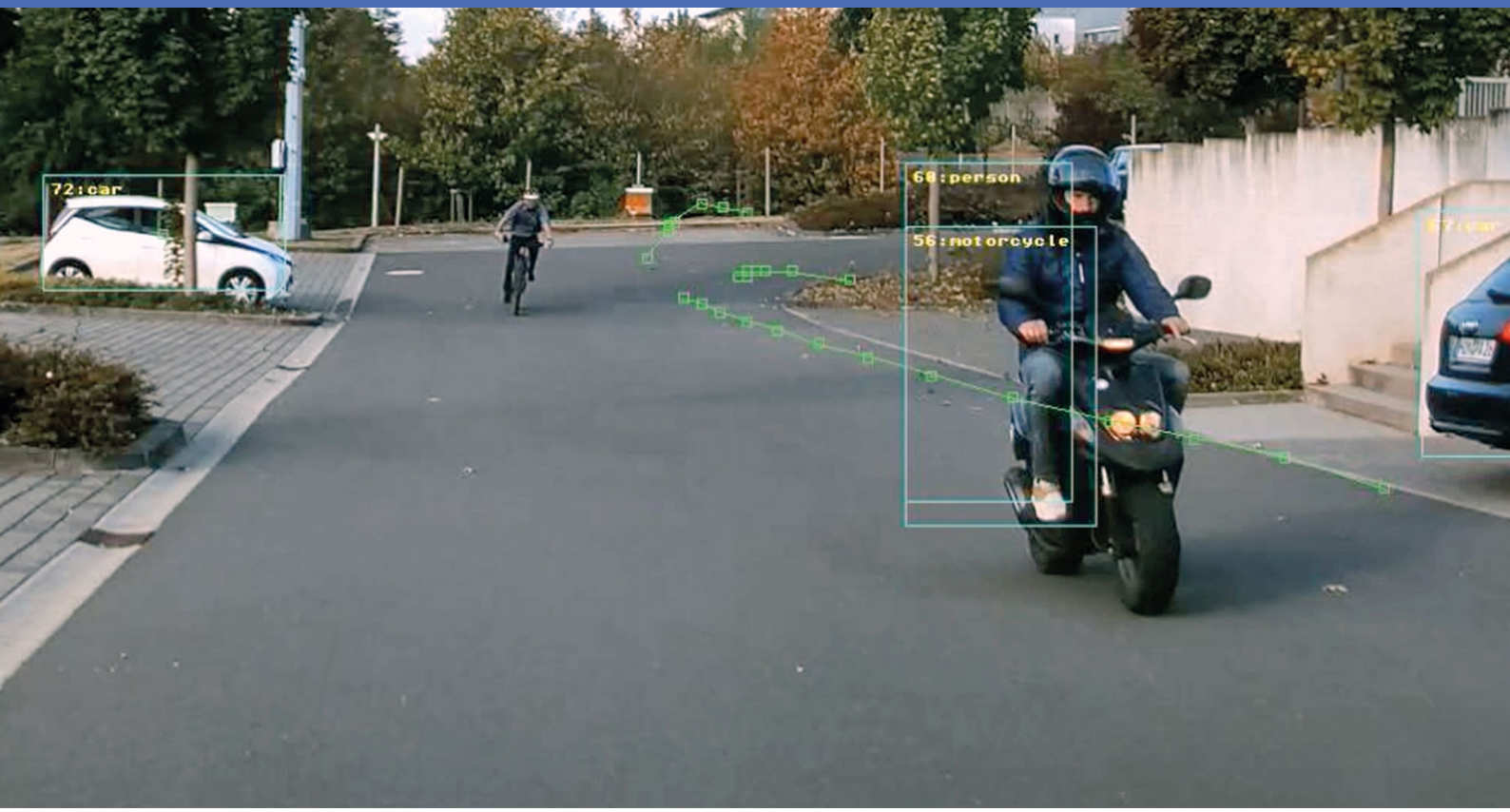
Guideline

MxAnalytics App



BeyondHumanVision

MOBOTIX

V3.04_10/7/2024, Order Code: Mx-APP-MX-THD

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Before You Start

Support

MOBOTIX Support

If you need technical support, please contact your MOBOTIX dealer. If your dealer cannot help you, he will contact the support channel to get an answer for you as quickly as possible.

If you have internet access, you can open the MOBOTIX help desk to find additional information and software updates.

Please visit **www.mobotix.com > Support > Help Desk**.

MOBOTIX eCampus

The MOBOTIX eCampus is a complete e-learning platform. It lets you decide when and where you want to view and process your training seminar content. Simply open the site in your browser and select the desired training seminar.

Please visit **www.mobotix.com/ecampus-mobotix**.

MOBOTIX Community

The MOBOTIX community is another valuable source of information. MOBOTIX staff and other users are sharing their information, and so can you.

Please visit **community.mobotix.com**.

Safety Notes

- This camera must be installed by qualified personnel and the installation should conform to all local codes.
- This product must not be used in locations exposed to the dangers of explosion.
- Do not use this product in a dusty environment.
- Protect this product from moisture or water entering the housing.
- Install this product as outlined in this document. A faulty installation can damage the product!
- Do not replace batteries of the camera. If a battery is replaced by an incorrect type, the battery can explode.
- External power supplies must comply with the Limited Power Source (LPS) requirements and share the same power specifications with the camera.
- When using a power adapter, the power cord shall be connected to a socket-outlet with proper ground connection.
- To comply with the requirements of EN 50130-4 regarding the power supply of alarm systems for 24/7 operation, it is highly recommended to use an uninterruptible power supply (UPS) for backing up the power supply of this product.

Legal Notes

Legal Aspects of Video and Sound Recording

You must comply with all data protection regulations for video and sound monitoring when using MOBOTIX AG products. Depending on national laws and the installation location of the cameras, the recording of video and sound data may be subject to special documentation or it may be prohibited. All users of MOBOTIX products are therefore required to familiarize themselves with all applicable regulations and to comply with these laws. MOBOTIX AG is not liable for any illegal use of its products.

Declaration of Conformity

The products of MOBOTIX AG are certified according to the applicable regulations of the EC and other countries. You can find the declarations of conformity for the products of MOBOTIX AG on www.mobotix.com under **Support > Download Center > Marketing & Documentation > Certificates & Declarations of Conformity**.

RoHS Declaration

The products of MOBOTIX AG are in full compliance with European Unions Restrictions of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive 2011/65/EC) as far as they are subject to these regulations (for the RoHS Declaration of MOBOTIX, please see www.mobotix.com, **Support > Download Center > Marketing & Documentation > Brochures & Guides > Certificates**).

Disposal

Electrical and electronic products contain many valuable materials. For this reason, we recommend that you dispose of MOBOTIX products at the end of their service life in accordance with all legal requirements and regulations (or deposit these products at a municipal collection center). MOBOTIX products must not be disposed of in household waste! If the product contains a battery, please dispose of the battery separately (the corresponding product manuals contain specific directions if the product contains a battery).

Disclaimer

MOBOTIX AG does not assume any responsibility for damages, which are the result of improper use or failure to comply to the manuals or the applicable rules and regulations. Our General Terms and Conditions apply. You can download the current version of the **General Terms and Conditions** from our website at www.mobotix.com by clicking on the corresponding link at the bottom of every page.

It is the User's responsibility to comply with all applicable local, state, national and foreign laws, rules, treaties and regulations in connection with the use of the Software and Product, including those related to data privacy, the Health Insurance Portability and Accountability Act of 1996 (HIPPA), international communications and the transmission of technical or personal data.

About MxAnalytics App

Object Recognition Based on Artificial Intelligence

The app's artificial intelligence-based algorithms collect behavioral data on individuals and objects. In a heat map, the most frequented locations in the detection are color-coded. Furthermore movements in defined restricted areas can be detected.

- Free of charge and license-free.
- Motion detection in (defined) restricted areas.
- Person/object counting based on motion detection (optional: accumulated).
- Creates Heatmaps.
- Auto-generated counting and heat map reports.
- Can be used with all cameras of the MOBOTIX 7 system platform.

Best suited for the requirements of the following industries:

Utilities, Energy & Mining; Industry & Production, Government, Traffic & Transportation, Retail, Healthcare, Education & Science

CAUTION! Thermal sensors are not supported by this app.

Smart Data Interface to MxManagementCenter

This app has a Smart Data interface to MxManagementCenter.

With the MOBOTIX Smart Data System, transaction data can be linked to the video recordings made at the time of the transactions. Smart Data source can be e.g. MOBOTIX Certified Apps (no license required) or general Smart Data sources (license required) like POS systems or license plate recognition systems.

The Smart Data System in MxManagementCenter enables you to quickly find and review any suspicious activities. The Smart Data Bar and the Smart Data View are available for searching and analyzing transactions. The Smart Data Bar provides a direct overview of the most recent transactions (from the last 24 hours) and for this reason it is convenient to use it for reviews and searches.

NOTE! For information on how to use the Smart Data System, see the corresponding online help of the camera software and MxManagementCenter.

Technical Specifications

Product Information

Product Name	MxAnalytics App
Supported MOBOTIX Cameras	Mx-M73A, Mx-S74A
Minimum Camera Firmware	V7.0.6.x
MxManagementCenter Integration	■ min. MxMC v2.4 ■ Advanced Config license required

Product Features

App Features	Analytics features: ■ People / Object Counting ■ Heatmap ■ Restricted Area (Motion Detection) Other features: ■ time table to enable MxAnalytics only within defined schedules (e.g. opening hours) ■ auto-generated people / object counting reports ■ auto-generated heatmap reports ■ MOBOTIX events via MxMessageSystem
Maximum number of counting corridors	16
Maximum number of restricted areas	20
Supported image sensor types	Day, Night, Day/Night
Dual / Multi Sensor usage	No
MxMessageSystem supported	Yes

Report export formats	Counting reports: CSV and HTML (table view) Heatmap reports: JPEG
MOBOTIX events	Yes
ONVIF Events	Yes (Generic Message events)

Hardware Requirements

Camera Sensor Connector	Connector 1 (Only one image sensor usable)

Scene Requirements for Object Counting / Heatmapping

Recommended camera position	ceiling mounted (90°), wall mounted (0°)
Recommended installation height (camera)	2,5 - 10 m (depending on lens variant)
Minimum object size	250px

Technical App Specifications

Synchronous / Asynchronous App	Asynchronous
Detection accuracy	Person: > 90% Vehicle: > 80%
Counting accuracy	> 90%
Processed number of frames per second	typ. 5 fps

Licensing Certified Apps

There is no license required for MxAnalytics App.

The usage period begins with activation of the app interface (see Activation of the Certified App Interface, p. 13)

NOTE! For buying or renewing a license, contact your MOBOTIX Partner.

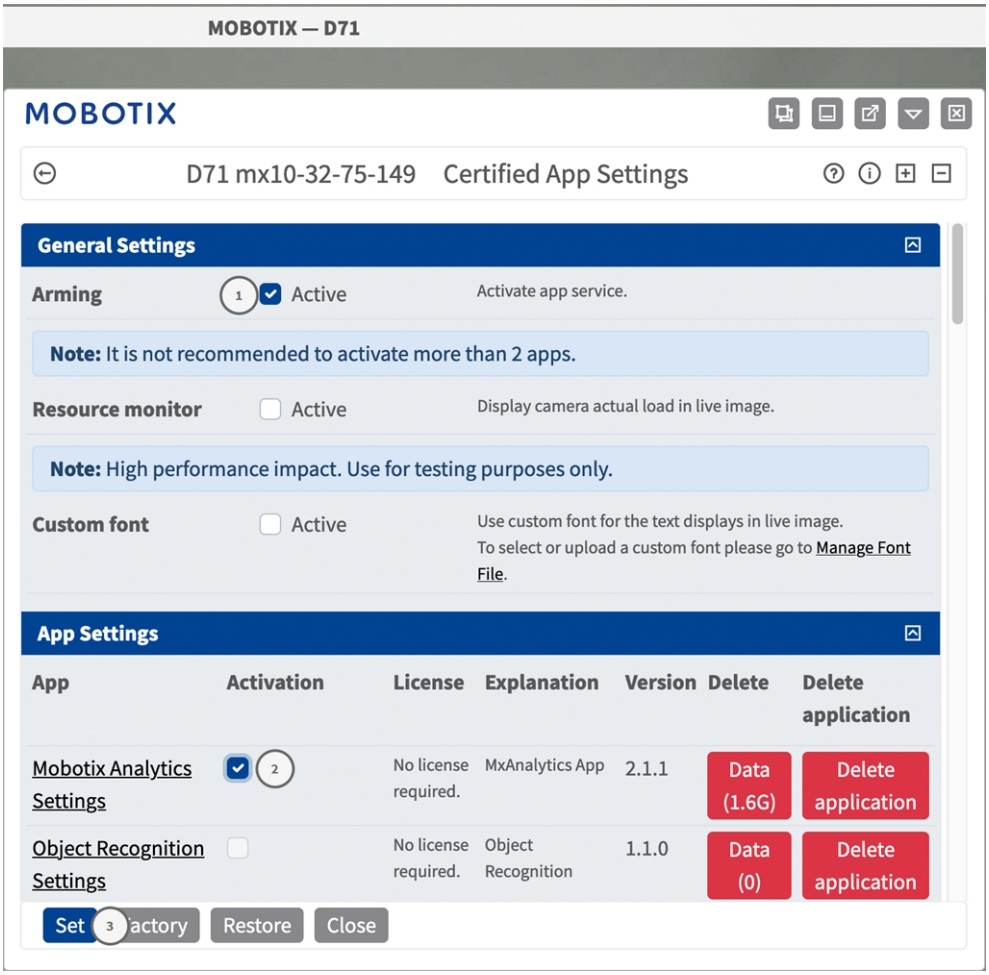
NOTE! Apps are usually pre-installed with the firmware. In rare cases, apps must be downloaded from the website and installed. In this case see **www.mobotix.com > Support > Download Center > Marketing & Documentation**, download and install the app.

Activation of the Certified App Interface

CAUTION! The MxAnalytics App does not consider obscure areas defined for the live image. Therefore there is no pixelation in obscure areas while configuring the app and during image analysis by the app.

NOTE! The user must have access to the setup menu (http(s)://<camera IP address>/control). Therefore check the user rights of the camera.

1. In the camera web interface, open: **Setup Menu / Certified App Settings** (http(s)://<camera IP address>/-control/app_config).



2. Under **General Settings** activate the **Arming** of the MOBOTIX interface (see screenshot).
3. Under **App Settings** check the **Active** option
4. Click on the name of the App to be configured to open the Apps user interface.
5. For configuration of the App see Configuration of MxAnalytics App, p. 14.

Configuration of MxAnalytics App

CAUTION! The user must have access to the setup menu (http(s)://<camera IP address>/control). Therefore check the user rights of the camera.

1. In the camera web interface, open: **Setup Menu / Certified App Settings** (http(s)://<camera IP address>/-control/app_config).
2. Click on the name of the **MxAnalytics App**.

The configuration window of the app appears with the following options:

Basic settings

The following configurations should be taken into account:

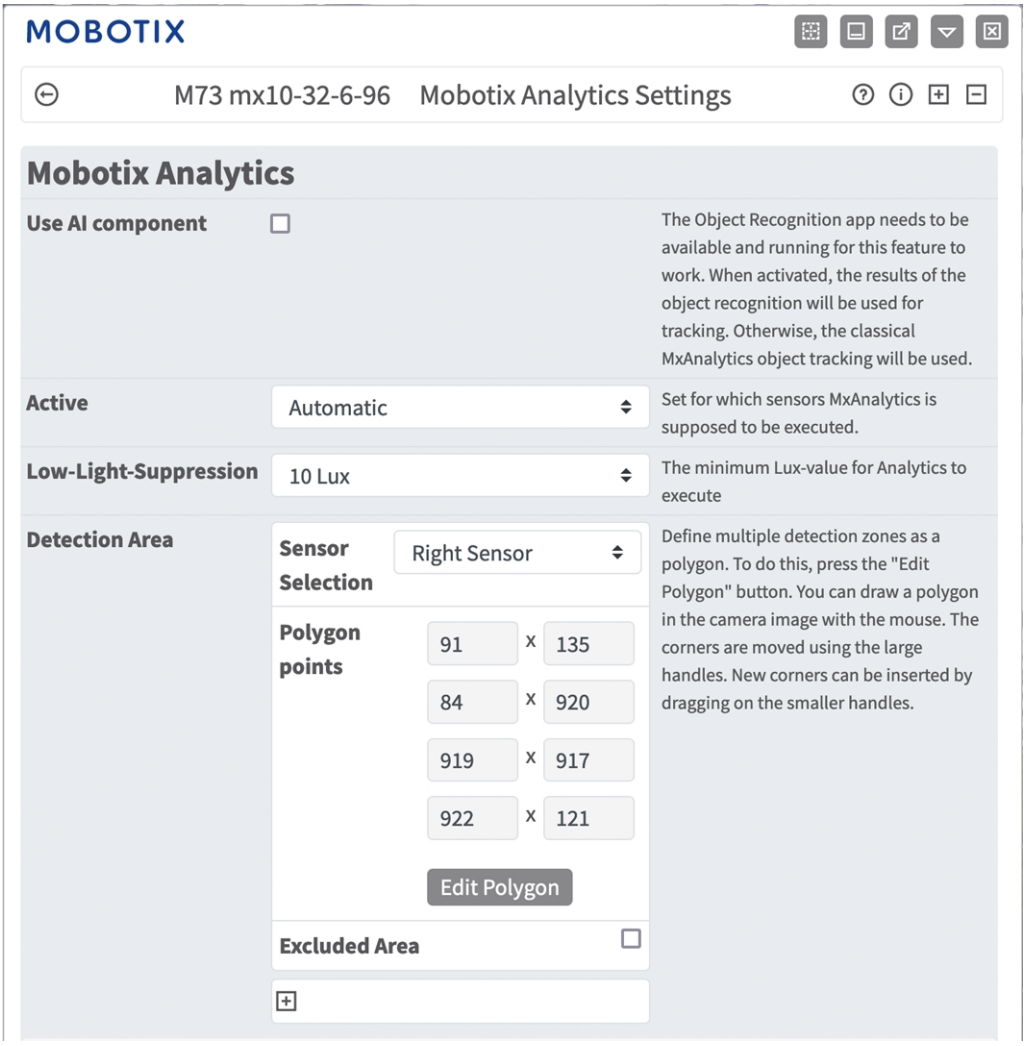
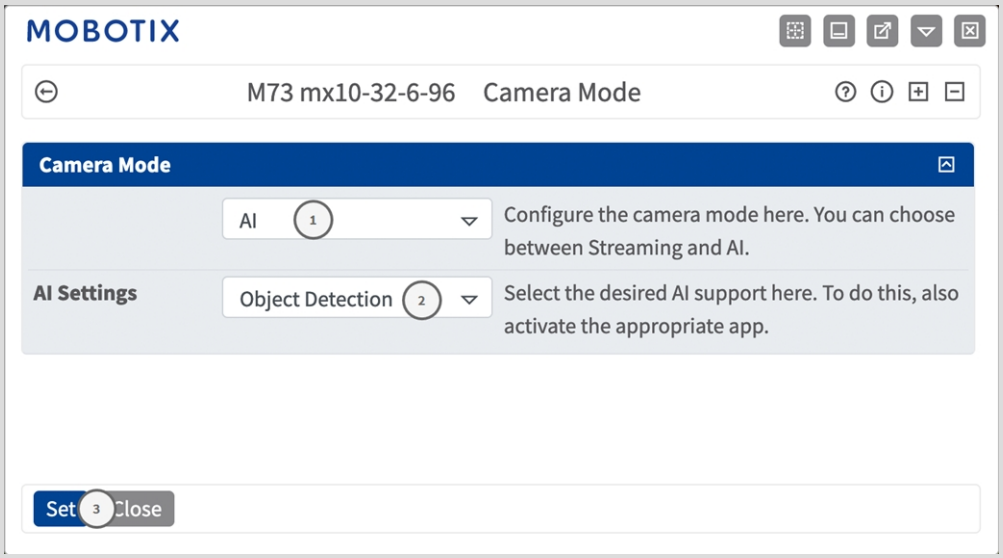


Fig. 1: Basic settings

Use AI component: Check, if the AI based video analytics should be used to recognize and classify Persons, Vehicles (Car, Truck, Bus, Motorcycle, Bicycle, Boat, Airplane, Train) and Animals: Bird, Cat, Dog, Horse, Sheep, Cow, Elephant, Bear, Zebra, Giraffe

NOTE! The AI component requires the Object Recognition App to run properly. To do so:

In the camera web interface, open **Admin Menu / Hardware Configuration / Camera Mode**



Set the Camera Mode to "**AI**" ① .

Set the AI Settings to "**Object Detection**" ② .

Click **Set**.

Reboot the camera.

Setup Menu / Certified App Settings activate "**Object Recognition Settings**".

Click **Set**.

NOTE! For further information about the MOBOTIX Object Recognition App see the Apps Guideline: **www.mobotix.com > Support > Download Center > Marketing & Documentation > Manuals**.

Active: Select the sensors to be used by the MxAnalytics App.
Low-Light -Supression: Select the minimum lux value for MxAnalytics App to execute.
Detection Area: You can define the detection area as polygon by defining the coordinates of corner points (see Detection Area, p. 16).

Detection Area

You can define multiple detection area as polygons by defining the coordinates of corner points.

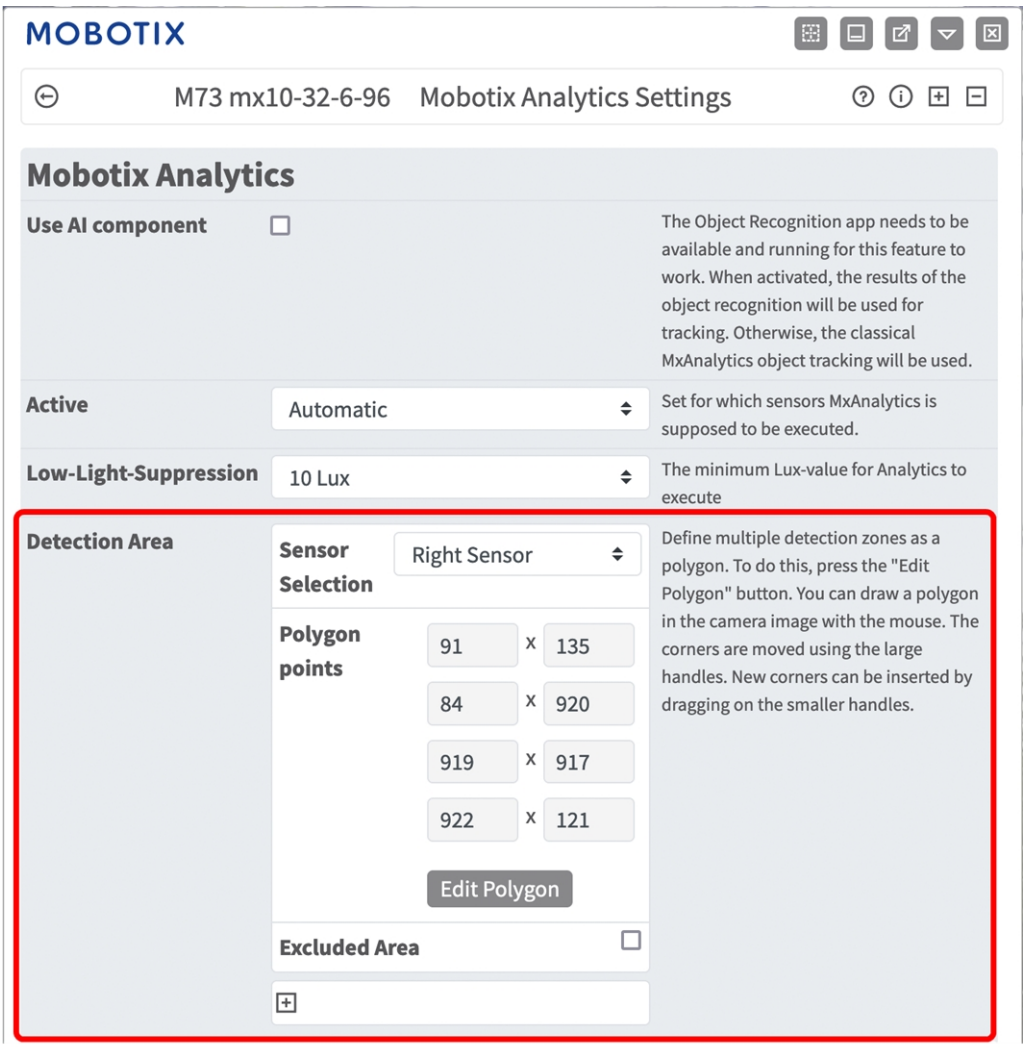
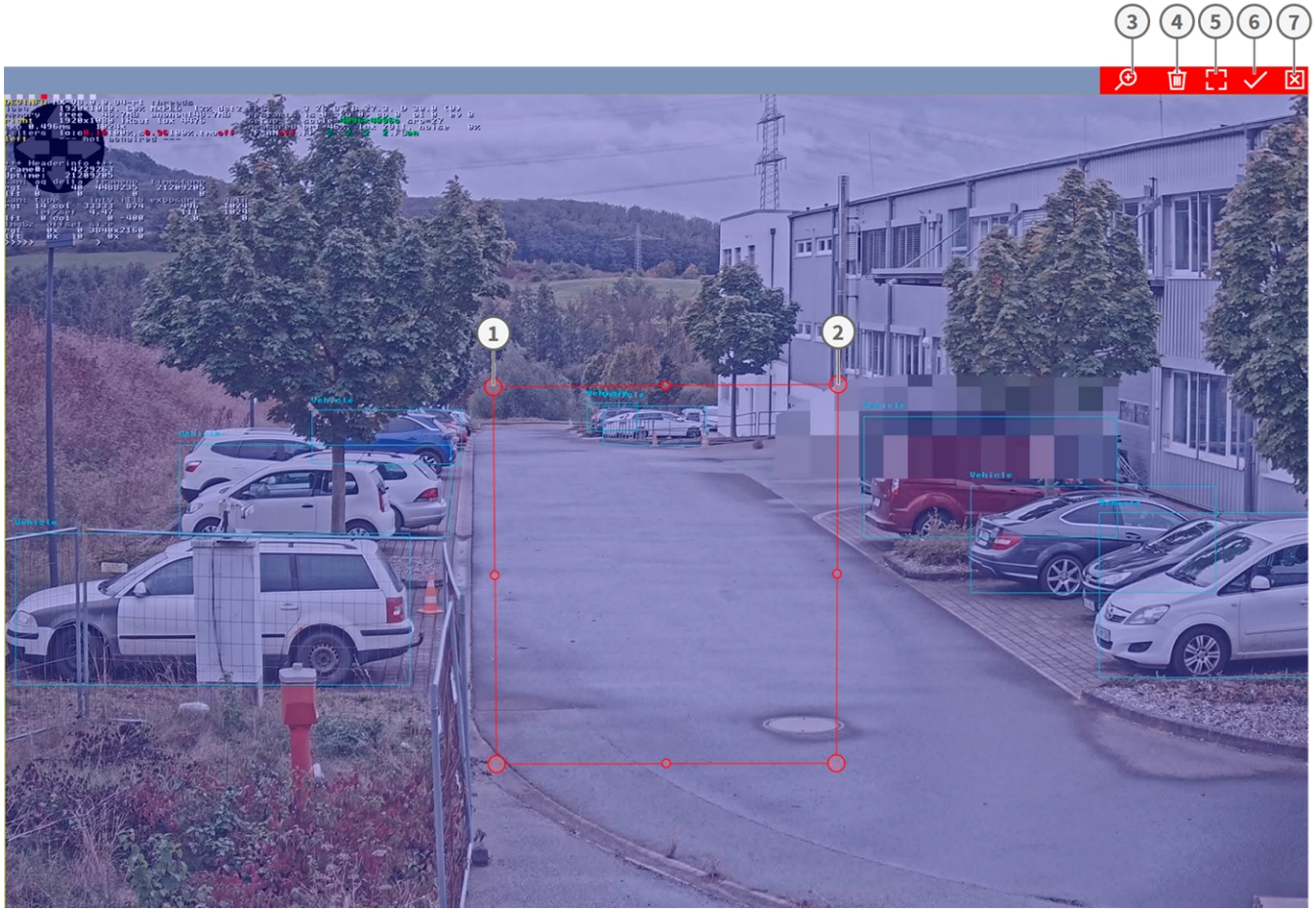


Fig. 2: Detection Area

Sensor Selection: If the camera has multiple image sensors, select the one that provides the video stream to be analyzed for the current Detection Area.
Polygon Points: The defined corner points of the Detection Area. Click **Edit Polygon** to draw the Detection Area in the Live View (see Drawing a Polygon Area in the Live View, p. 17).
Excluded Area: Check it if the defined area should be excluded from the analysis.
Click the **Plus** icon ① to define another Detection Area.

Drawing a Polygon Area in the Live View

In Live View you can draw areas based on polygons depending on the App. These areas are e.g. Detection Areas, Excluded Areas, Reference Areas, Ignore Areas etc.



When you have clicked on the “Edit Polygon” button, the editor opens with a live image and a predefined polygon.

1. Drag the corner points ① of the polygon to the desired positions.
2. To add another corner point, drag a smaller point ② between two corner points on the contour of the area.
3. Click **Zoom in/out** ③ to zoom the live image in or out
4. Click **Delete** ④ to delete the polygon, then click and drag a new rectangular area.
5. Click **Maximize** ⑤ to extend the polygon to the entire camera image.
6. Click **Submit** ⑥ to save and adopt the coordinates of the polygon.
7. Click **Cancel** ⑦ to close the editor without saving any changes

Installation Settings

For best analytics results camera position as well as the object size need to be specified as accurate as possible.

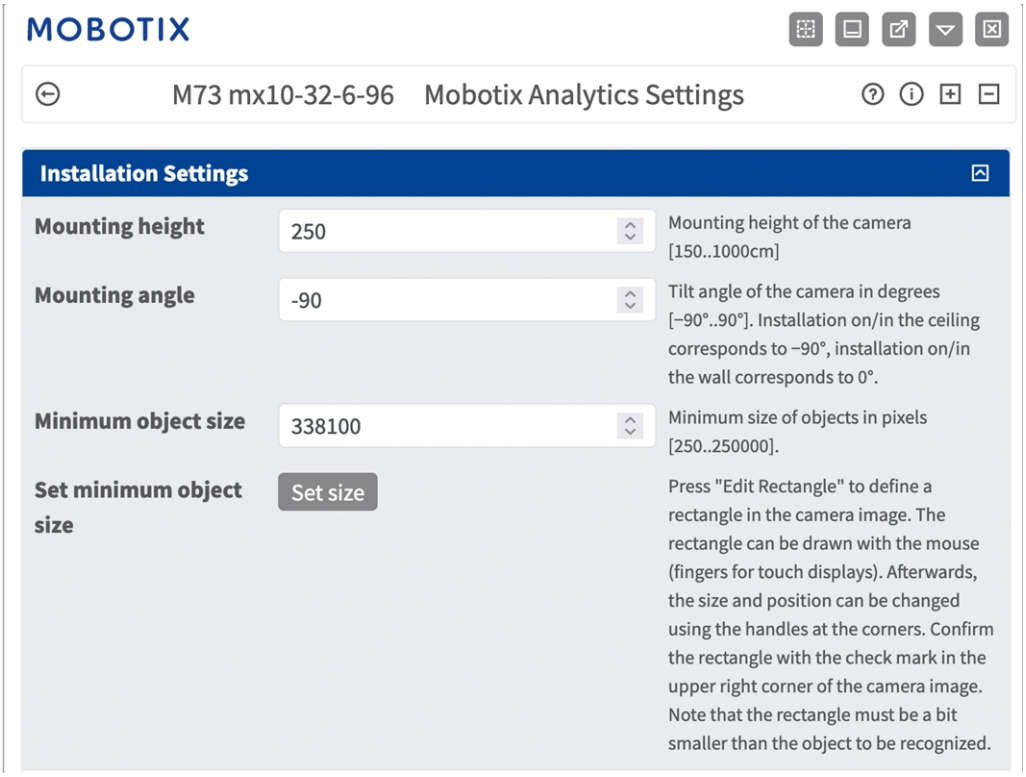


Fig. 3: Installation settings

Mounting height: Mounting height of the camera (150- 1000cm)
Mounting angle: Tilt angle of the camera in degrees [−90°- 90°]. Installation on/in the ceiling corresponds to −90°, installation on/in the wall corresponds to 0°.
Minimum object size: Minimum size of objects in pixels (250 - 250000)
Set minimum object size: In the live image define a rectangle with the minimum object size (see Setting the Minimum Object Size, p. 19).

NOTE! the rectangle must be a bit smaller than the object to be recognized.

Setting the Minimum Object Size

1. Click the **plus** icon ① to switch into the Live View.
2. In the Live View click and drag a rectangle defining the minimum object size.
3. Drag the corner points to refine rectangle.

4. In the top right corner of the live view click **Submit** to adopt the coordinates of the rectangle.
5. Optionally click the **bin** icon ② to delete rectangle.

NOTE! the rectangle must be a bit smaller than the object to be recognized.

Visualization Setting

Define how the MxAnalytics App objects look in the live image:

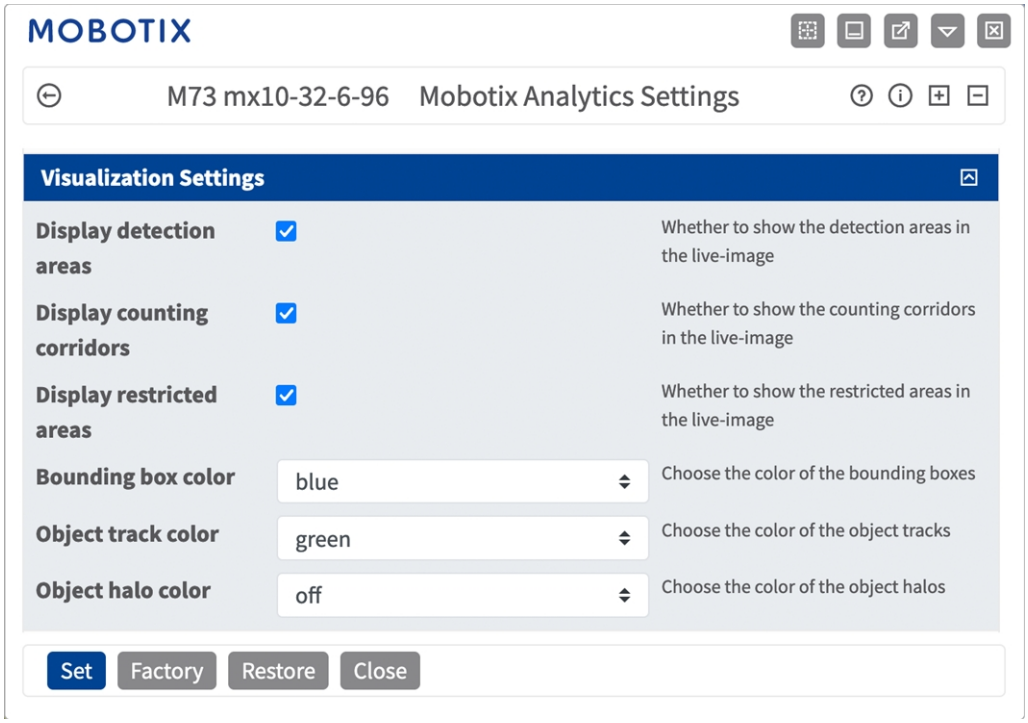


Fig. 4: Visualization settings

Display detection areas: Check to show the detection areas in the live image.
Display counting corridors: Check to show counting corridors in the live image.
Display restricted areas: Check to show restricted areas in the live image.
Bounding box color: Select a bounding box color for detected objects.
Object track color: Select a color for the tracking path of detected objects.
Object halo color: Select a color for the object halos.
Object halo transparency: Enter a transparency value in percent for the object halos.

Event Setting

In the Event Settings section you can define counting corridors and restricted areas.

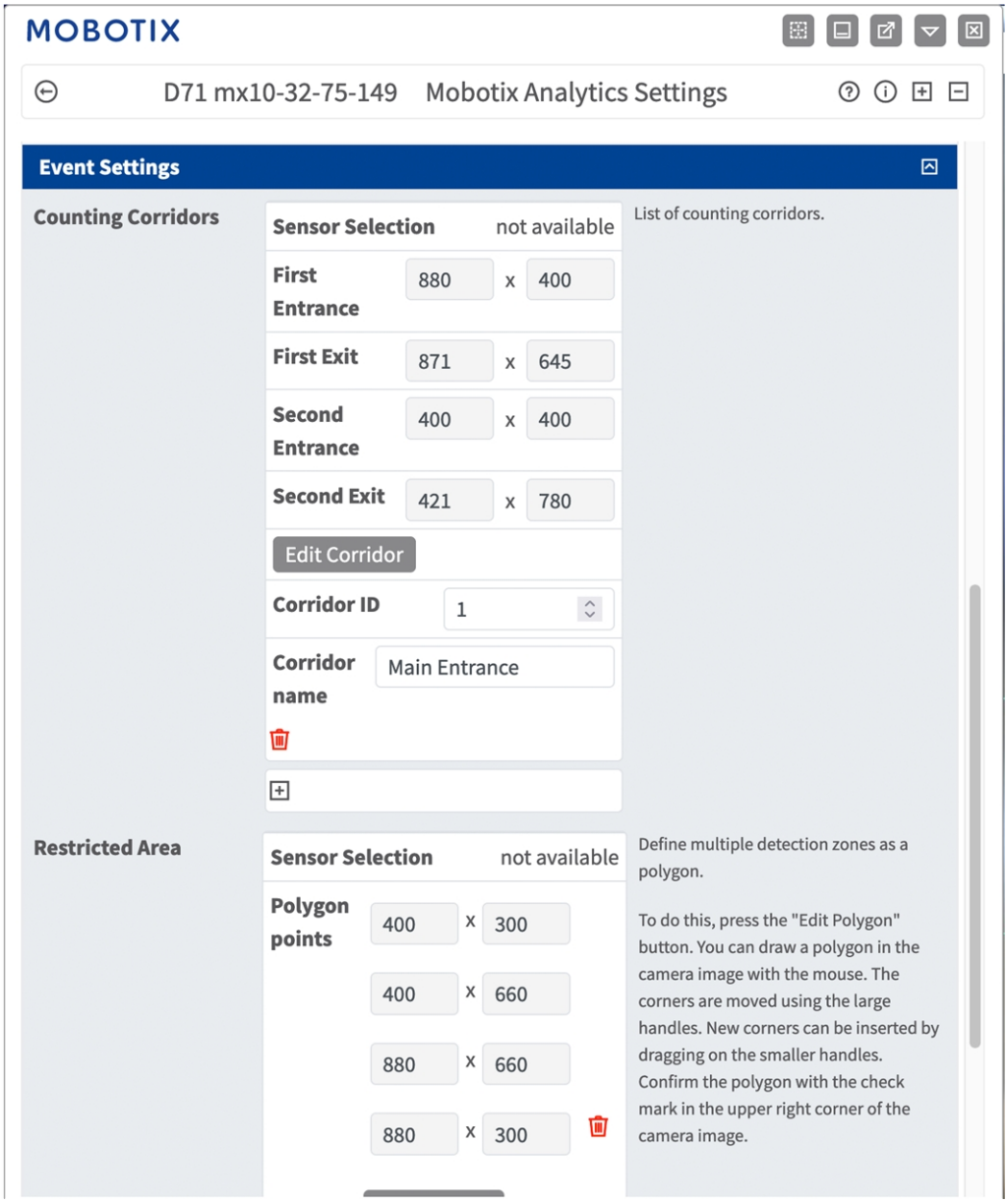


Fig. 5: Event settings

Drawing a Counting Corridor in the Live View

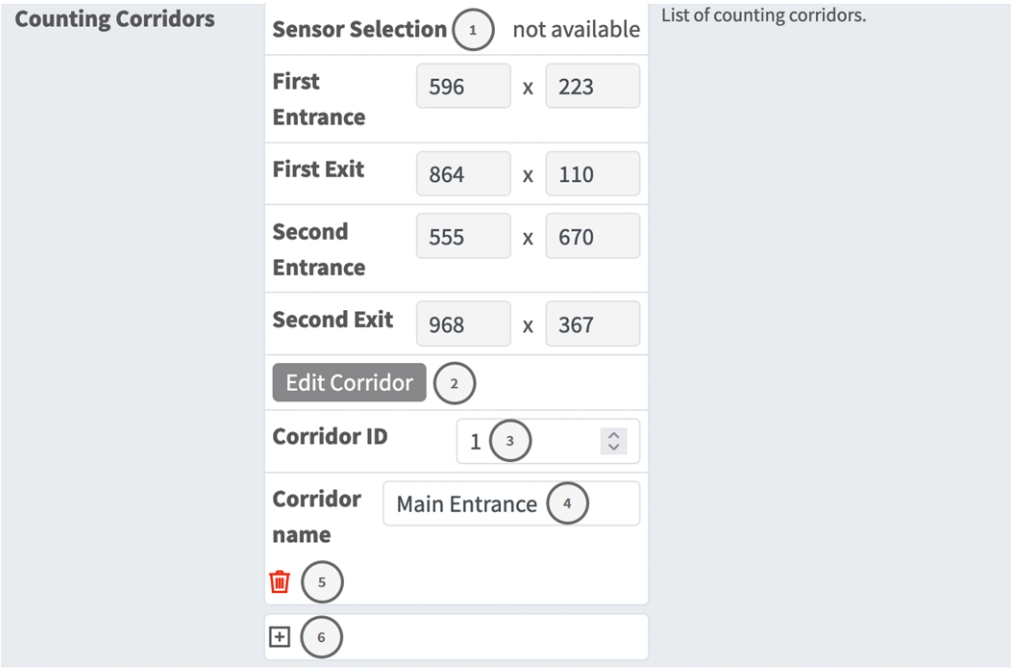


Fig. 6: Adding a counting corridor

1. If applicable, **select the sensor** ① that provides the image in which the corridor is to be drawn.
2. Click **Edit Corridor**② to switch into the Live View

   NOTE! In Live View, there is a rectangular counting corridor given with four corner points by default. Within the corridor there is an arrow that indicates the direction of movement of the objects to be counted.

3. In the Live View click and drag the corner points to the desired position.
4. In the top right corner of the live view click **Submit** to adopt the coordinates of the polygon.
5. Set the **Corridor ID**③ .
6. Enter a meaningful Corridor Name ④ .
7. Optionally click the **Plus Icon**⑤ to draw another Counting Corridor.
8. Optionally click the **Bin Icon**③ to delete a Counting Corridor.

Drawing a Restricted Area in the Live View

In Live View, there is a rectangular counting corridor given with four corner points by default. Within the corridor there is an arrow that indicates the direction of movement of the objects to be counted.

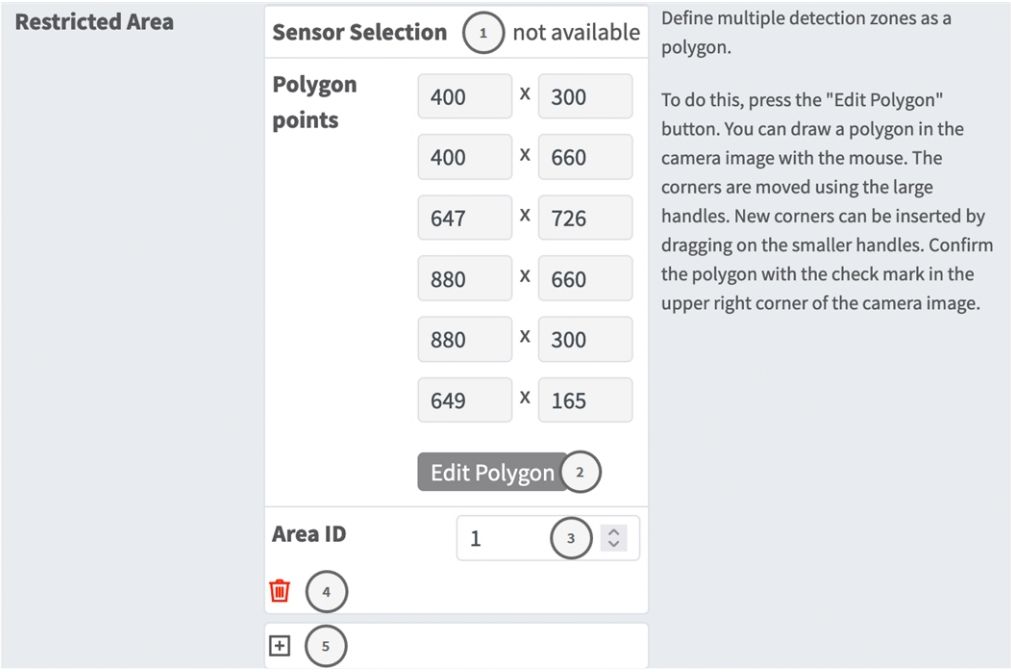


Fig. 7: Adding a restricted area

1. If applicable, **select the sensor** ① that provides the image in which the Restricted Area is to be drawn.
2. Click **Edit Polygon**② to switch into the Live View

   NOTE! In Live View, there is a rectangular polygon representing a Restricted Area given with four corner points by default.

3. In the Live View click and drag the corner points to the desired position.
4. To add another corner point click on the desired position on the contour of the detection area.
5. In the top right corner of the live view click **Submit** to adopt the coordinates of the polygon.
6. Set the **Area ID**③ .
7. Optionally click the **Plus Icon**④ to draw another Restricted Area.
8. Optionally click the **Bin Icon**⑤ to delete a Restricted Area.

Heatmap Setting

In this section you can define heatmap settings e.g. for crowd analytics.

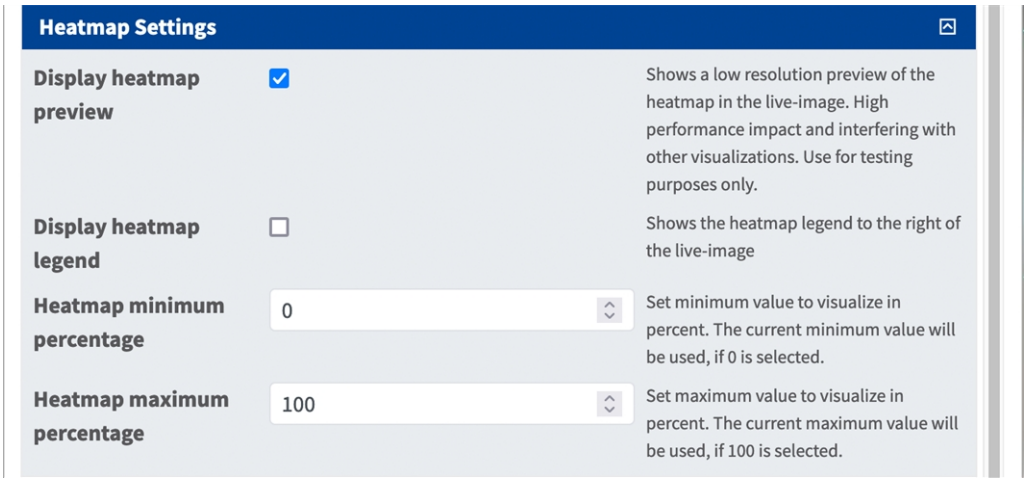


Fig. 8: Heatmap settings

Heatmap Label: Select a heatmap label to make sure only select objects will be used to generate a heatmap.
Display heatmap preview: Check for testing purposes only. Shows a low resolution preview of the heatmap in the live-image. High performance impact and interfering with other visualizations. Use for testing purposes only.
Display heatmap legend: Check to show the heatmap legend to the right of the live-image.
Heatmap minimum percentage: Set the minimum value to visualize in percent. The current minimum value will be used, if 0 is selected.

Heatmap maximum percentage: Set the maximum value to visualize in percent. The current maximum value will be used, if 100 is selected.

Storage Setting

Edit how long heatmap and corridor data should be stored:

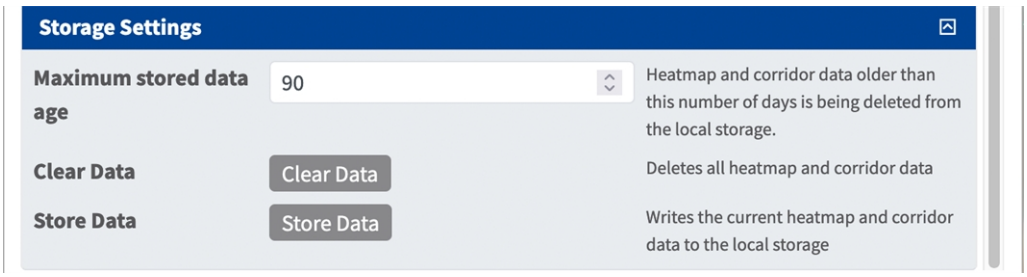


Fig. 9: Storage settings

Maximum storage data age: Enter the number of days after heatmap and corridor data are being deleted from the local storage.
Clear data: Click to delete all heatmap and corridor data.
Store data: Click to write the current heatmap and corridor data to the local storage.

Storing the Configuration

To store the configuration you have the following options:

- Click **Set** to activate your settings and to save them until the next reboot of the camera.
- Click **Factory** to load the factory defaults for this dialog (this button may not be present in all dialogs).
- Click **Restore** to undo your most recent changes that have not been stored in the camera permanently.
- Click **Close** to close the dialog. While closing the dialog, the system checks the entire configuration for changes. If changes are detected, you will be asked if you would like to store the entire configuration permanently.

After successfully saving the configuration, the event and meta data are automatically sent to the camera in case of an event.

MxMessageSystem

What is MxMessageSystem?

MxMessageSystem is a communication system based on name oriented messages. This means that a message must have a unique name with a maximum length of 32 bytes.

Each participant can send and receive messages. MOBOTIX cameras can also forward messages within the local network. This way, MxMessages can be distributed over the entire local network (see Message Area: Global).

For example, a MOBOTIX 7 series camera can exchange a MxMessage generated by a camera app with an Mx6 camera that does not support certified MOBOTIX apps.

Facts about MxMessages

- 128-bit encryption ensures privacy and security of message content.
- MxMessages can be distributed from any camera of the Mx6 and 7 series.
- The message range can be defined individually for each MxMessage.
  - **Local:** Camera expects a MxMessage within its own camera system (e.g. through a Certified App).
  - **Global:** the camera expects a MxMessage that is distributed in the local network by another MxMessage device (e.g. another camera of the 7 series equipped with a certified MOBOTIX app).
- Actions that the recipients are to perform are configured individually for each participant of the MxMessageSystem.

Basic configuration: Processing the automatically generated app events

Checking automatically generated app events

NOTE! After successfully activating the app (see Activation of the Certified App Interface, p. 13), a generic message event for this specific app is automatically generated in the camera.

1. Go to **Setup-Menu / Event Control / Event Overview**. In section **Message Events** the automatically generated message event profile is named after the application (e.g. MxAnalytics).

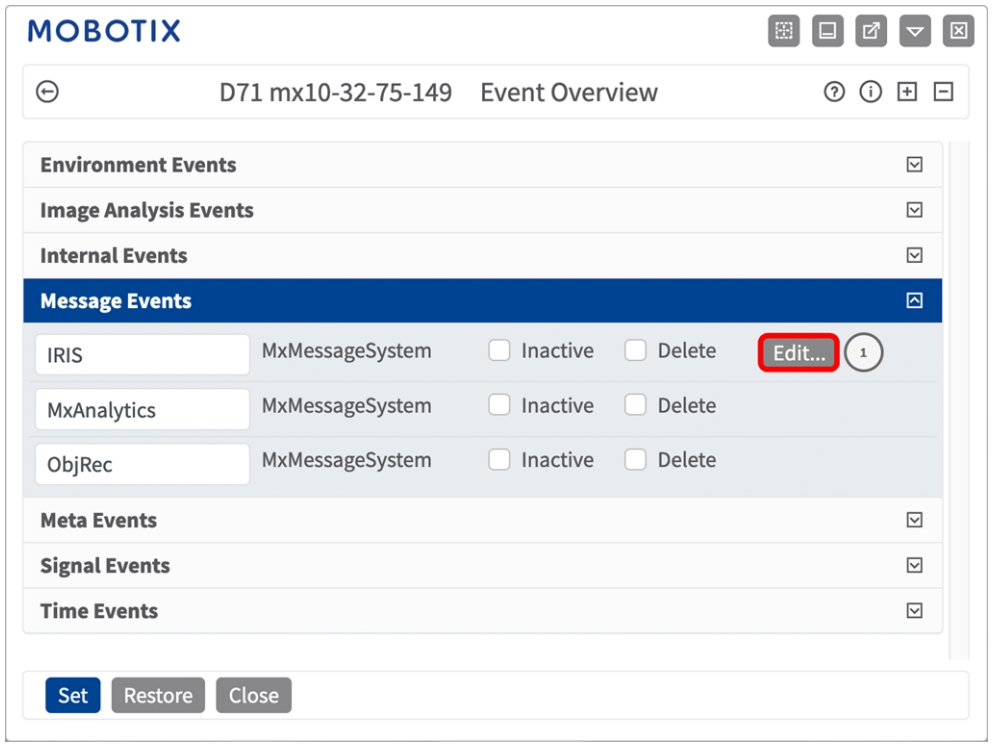


Fig. 10: Example: Generic message event from MxAnalytics App

2. Click **Edit**① to display and configure the event properties in detail.

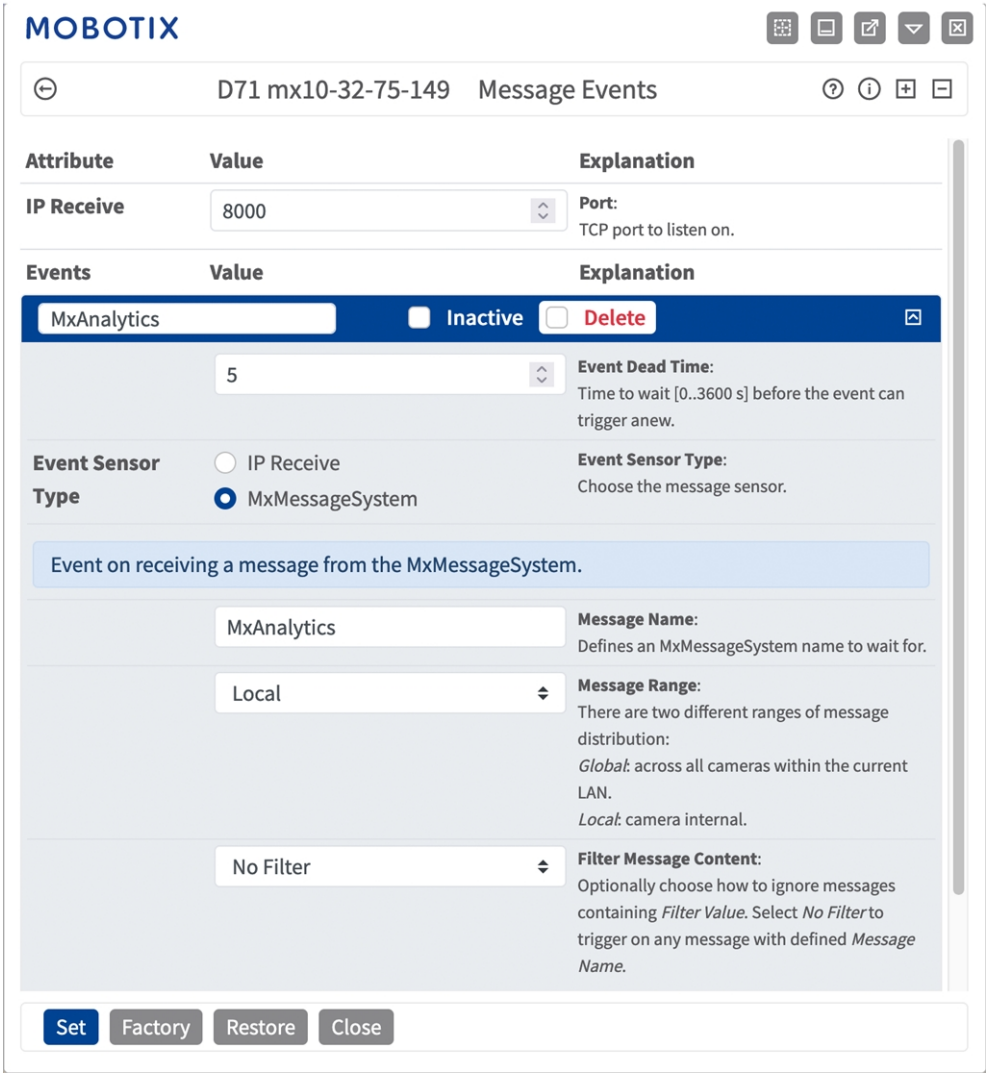


Fig. 11: Example: Generic message event details - no filter

Action handling - Configuration of an Action Group

CAUTION! To use events, trigger Action Groups or record images the general arming of the camera must be enabled (http(s)/<camera IP address>/control/settings)

An Action Group defines which action(s) is (are) triggered by the MxAnalytics App event.

1. In the camera web interface, open: **Setup Menu / Action Group Overview** (http(s)://<camera IP address>/control/actions).

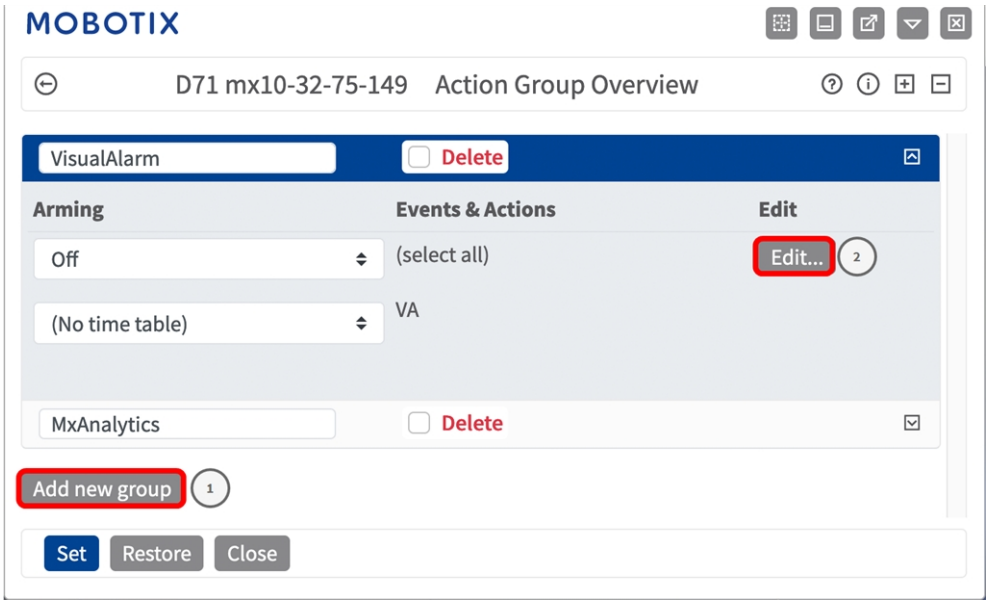


Fig. 12: Defining Action Groups

2. Click **Add new group**① and give a meaningful name.

3. Click **Edit**② , to configure the group.

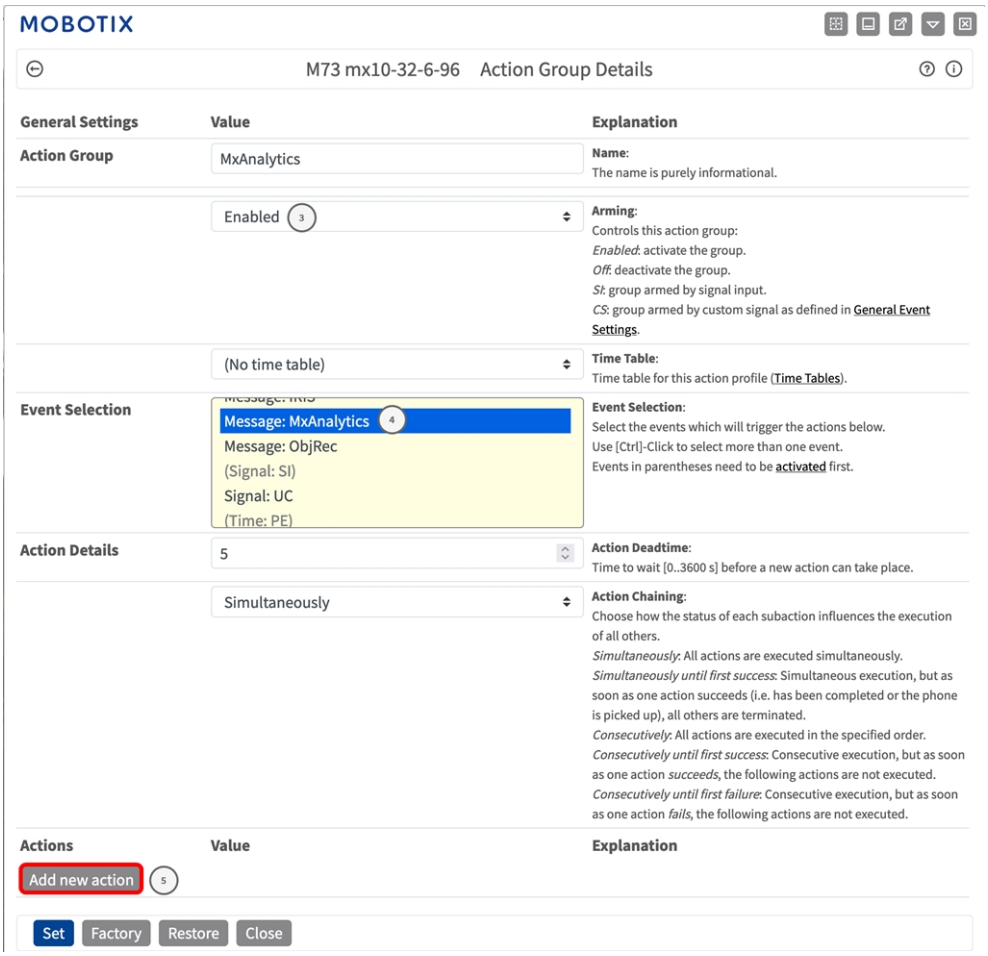


Fig. 13: Configuring an Action Group

4. Activate **Arming**③ of the Action Group.
5. Select your message event in the **Event selection**④ list. To select multiple events, press the shift key.
6. Click **Add new Action**⑤ .

7. Select a proper action from list **Action Type and Profile**⑥ .

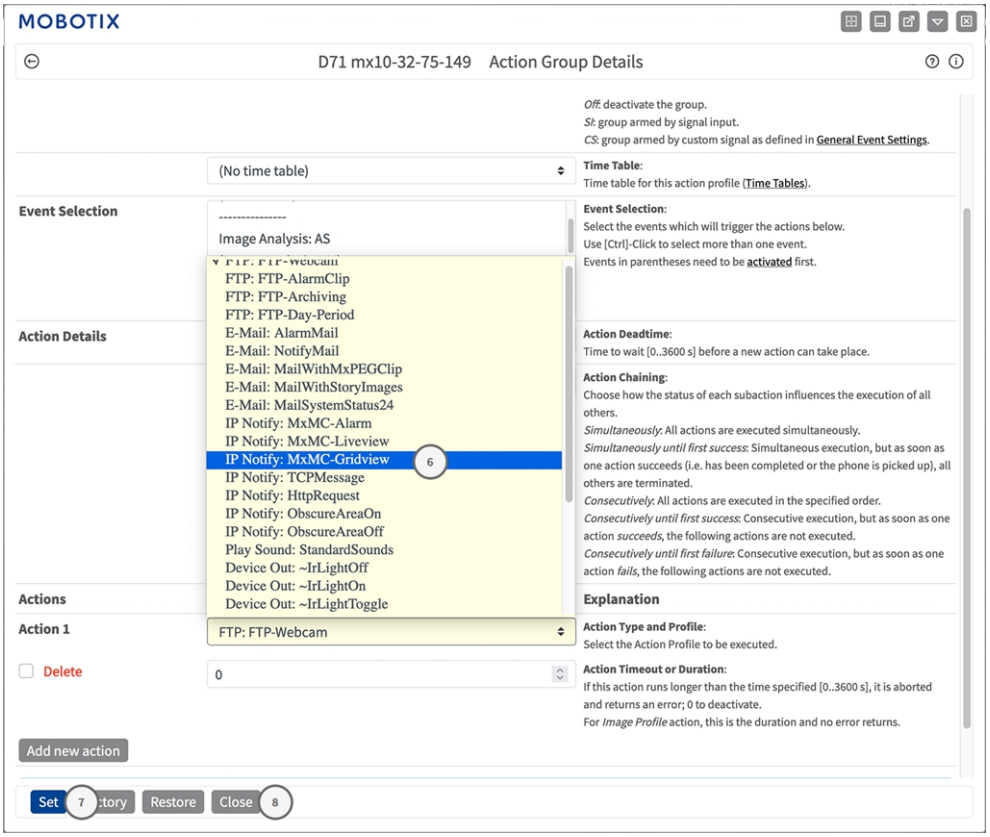


Fig. 14: Select Action Type- and Profile

NOTE! If the required action profile is not yet available, you can create a new profile in the Admin Menu sections "MxMessageSystem", "Transfer Profiles" and "Audio and VoIP Telephony".

If necessary, you can add further actions by clicking the button again. In this case, please make sure that the "action chaining" is configured correctly (e.g. at the same time).

8. Click on the **Set**⑦ button at the end of the dialog box to confirm the settings.
9. Click on **Close**⑧ to save your settings permanently.

Action settings - Configuration of the camera recording

1. In the camera web interface, open: **Setup Menu / Event Control / Recording**(http(s)/<camera IP address>/control/recording.

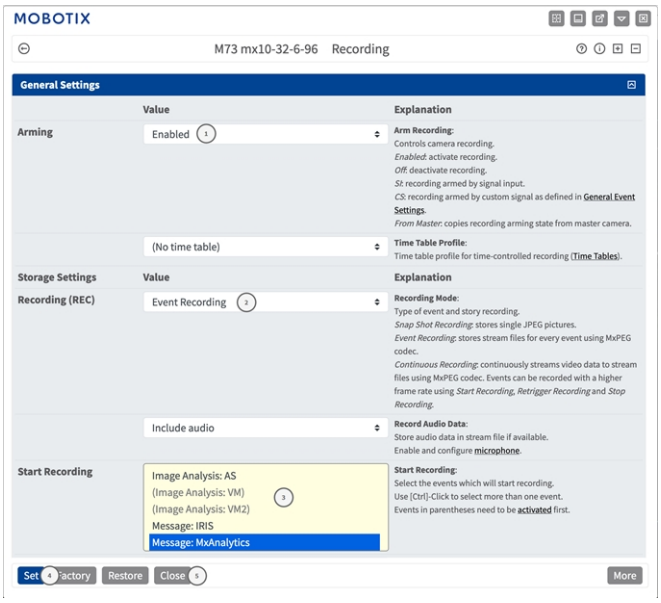


Fig. 15: Configuration of camera recording settings

1. Activate **Arm Recording**① .
2. Under **Storage Settings** / **Recording (REC)** select a **Recording mode**② . The following modes are available:
   - Snap Shot Recording
   - Event Recording
   - Continuous Recording
3. In list **Start recording**③ select the message event just created.
4. Click on the **Set**④ button at the end of the dialog box to confirm the settings.
5. Click on **Close**⑤ to save your settings permanently.

NOTE! Alternatively, you can save your settings in the Admin menu under Configuration / Save current configuration to permanent memory.

Advanced Configuration: Processing the meta data transmitted by apps

Meta data transferred within the MxMessageSystem

For each event, the app also transfers meta data to the camera. This data is sent in the form of a JSON schema within a MxMessage.

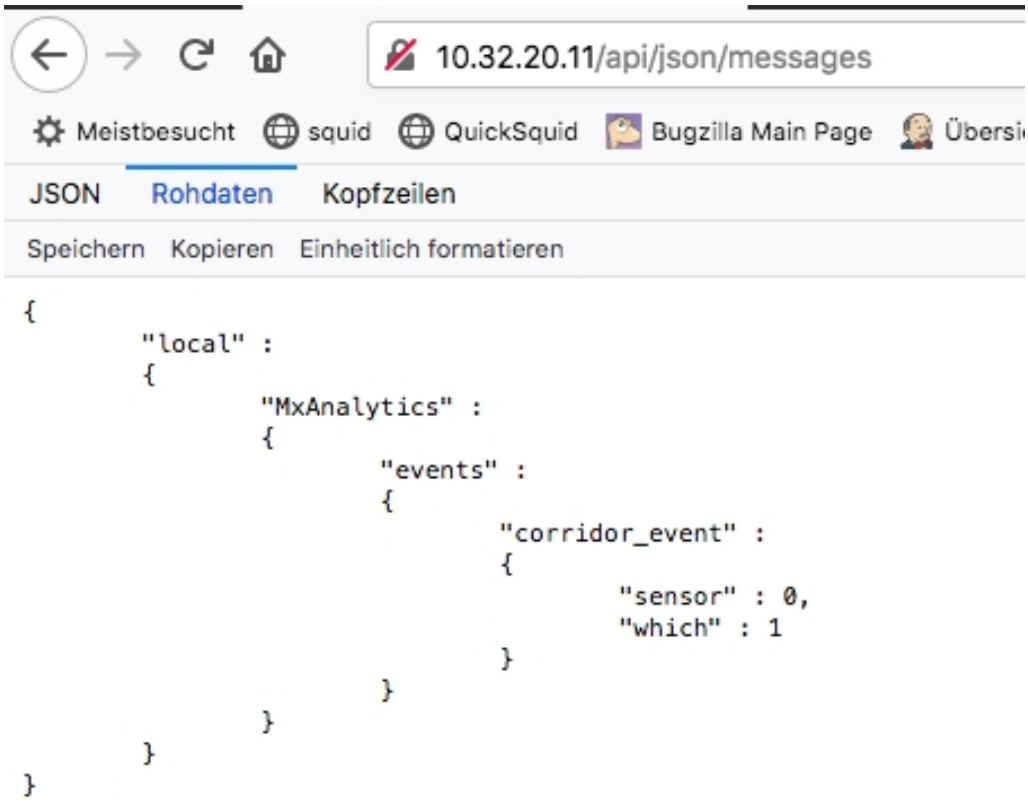


Fig. 16: Example: Meta data transmitted within a MxMessage of the MxAnalytics App

NOTE! To view the meta data structure of the last App event, enter the following URL in the address bar of your browser: http(s)://IPAddresseOfYourCamera/api/json/messages

Creating a Custom Message Event

1. Go to **Setup-Menu / Event Control / Event Overview**. In section **Message Events** the automatically generated message event profile is named after the application ① (e.g. MxAnalytics).

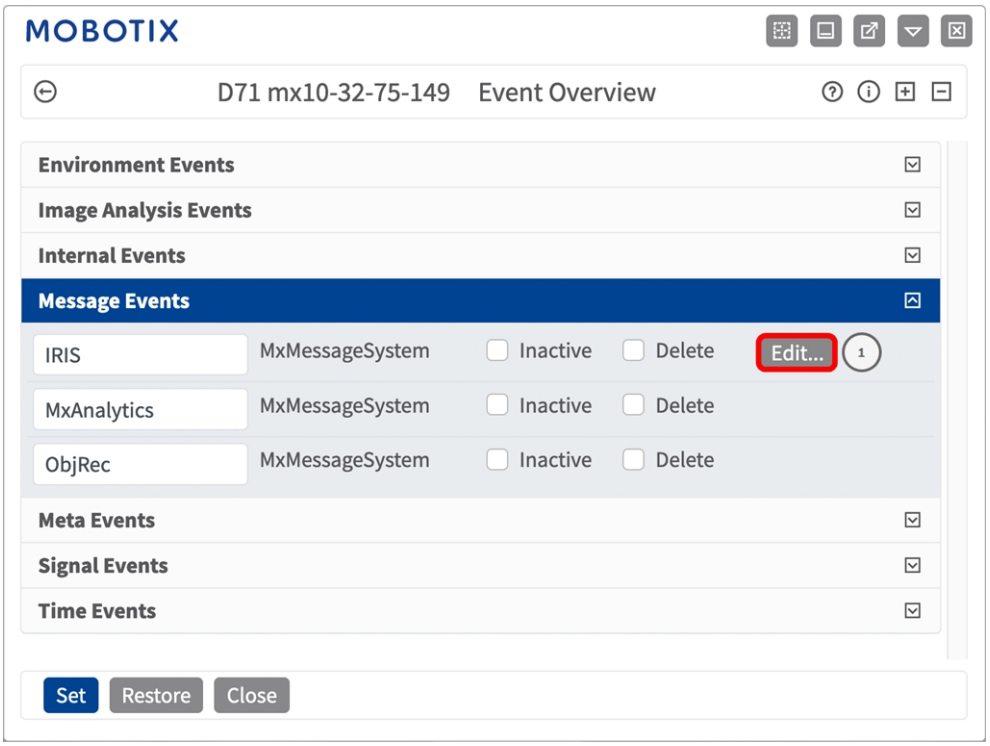


Fig. 17: Example: Generic message event from MxAnalytics App

2. Click **Edit**② to display and configure the event properties in detail.

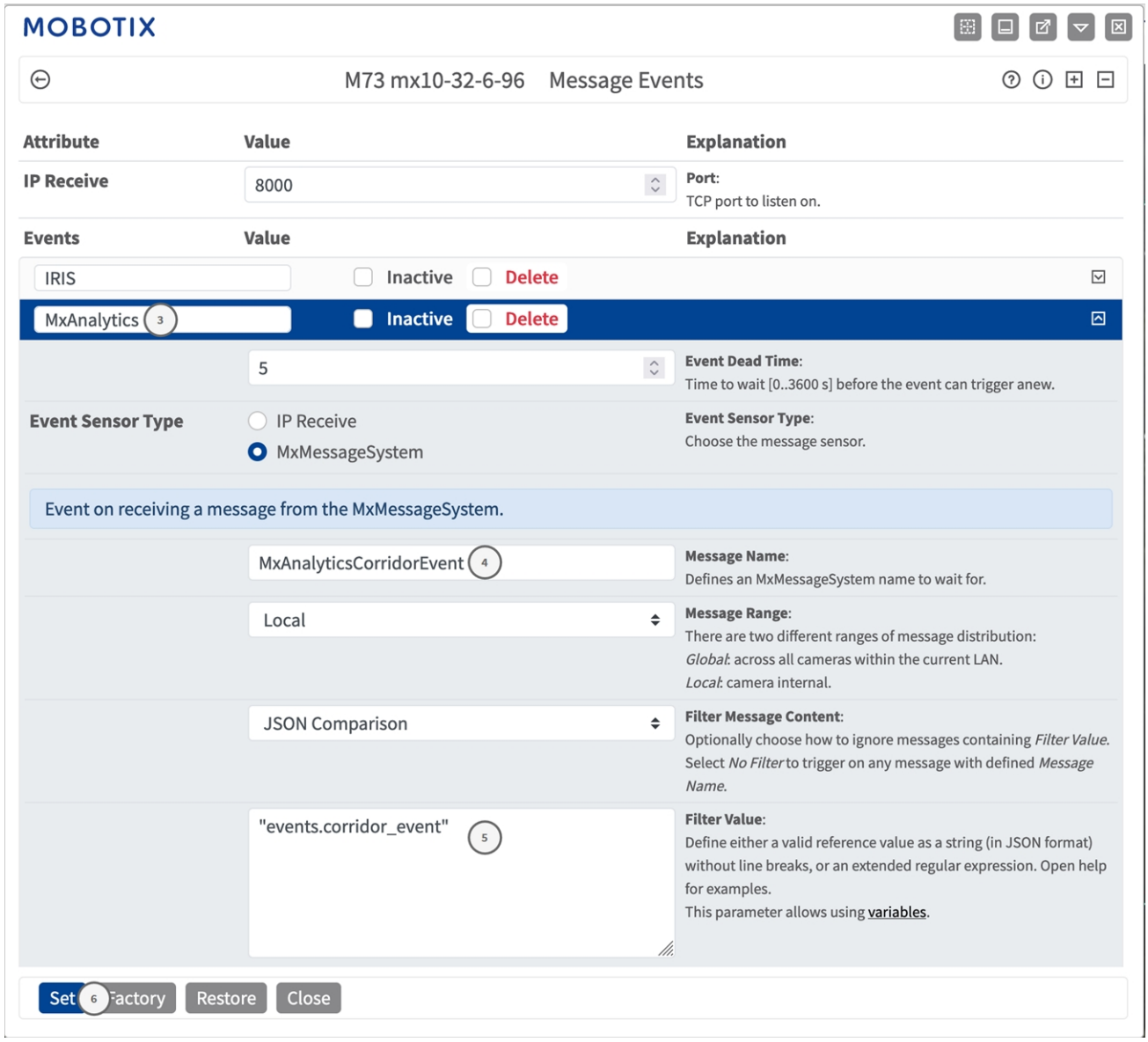


Fig. 18: Example: Corridor message event

3. Click on the event (e.g. MxAnalytics) ③ to open the event settings.

4. Configure the parameters of the event profile as follows:
   - **Message Name:** Enter the "Message Name" ④ according to the event documentation of the corresponding app (see Examples for message names and filter values of the MxAnalytics App, p. 36)
   - **Message Range:**
     - Local: Default settings for the MxAnalytics App
     - Global: (MxMessage is forwarded from another MOBOTIX camera in the local network.
   - **Filter Message Content:**
     - **No Filter:** Trigger on any message according to the defined **Message Name**.
     - **JSON Comparison:** Select if filter values are to be defined in JSON format.
     - **Regular Expression:** Select if filter values are to be defined as regular expression.
   - **Filter Value:**⑤ see Examples for message names and filter values of the MxAnalytics App, p. 36.

CAUTION! “Filter Value“ is used to differentiate the MxMessages of an app / bundle. Use this entry to benefit from individual event types of the apps (if available).
Choose “No Filter” if you want to use all incoming MxMessages as generic event of the related app.

2. Click on **Set**⑥ at the end of the dialog box to confirm the settings.

Examples for message names and filter values of the MxAnalytics App

MxMessage Name	Filter Value	Explanation
MxAnalytics.events.corridor_event		Message at each corridor increment
MxAnalytics.events.restricted_event		Message on each triggering of a Restricted Area
MxAnalytics	"sensor":0	Filter message by sensor (in this case sensor 0)
MxAnalytics	"which":5	Filter message by corridor or restricted area ID (in this case 5)

MxMessage Name	Filter Value	Explanation
ObjRec	"numObjects":[^0]	Message if any object is found in the image
ObjRec	"car"	Message when a car is detected in the image
ObjRec	"object3“	Message if at least 3 arbitrary objects were found in the image

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